Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A system for measuring erythema in a tooth, comprising:

means for generating light of a first frequency;

transmitting means for transmitting said light of said first frequency into said tooth;

detecting means for detecting shock waves induced in said tooth by said transmitted light of said first frequency; ~~and~~

processing means for processing said detected shock waves induced by said transmitted light of said first frequency to measure said erythema in said tooth;

means for generating light of a second frequency;

means for modulating said light of said first frequency to produce a modulated first light signal;

means for modulating said light of said second frequency to produce a modulated second light signal, wherein said modulated second light signal is different from said modulated first light signal;

said transmitting means being effective for transmitting said second light signal into said tooth;

said detecting means being effective for detecting shock waves induced in said tooth by said transmitted light of said first and second light signals; and

said processing means being effective for processing said detected shock waves induced in said tooth by said transmitted light of said first and second light signals to measure said erythema in said tooth.

2. (original) A system according to claim 1, wherein said first frequency has a high absorption coefficient for blood.

3. (cancelled).

4. (currently amended) A system according to claim [[3]] 1, wherein said first frequency of light has a high absorption coefficient for oxygenated blood and said second frequency of light has a high absorption coefficient for deoxygenated blood.

5. (original) A system according to claim 4, wherein said first and second frequencies of light have a high contrast in absorption with enamel and dentin.

6. (currently amended) A system according to claim [[3]] 1, wherein said first frequency of light has a high absorption coefficient for blood and said second frequency of light has a low absorption coefficient for blood.

7. (currently amended) A system according to claim [[3]] 1, wherein said first and second frequencies of light are transmitted into said tooth simultaneously.

8. (currently amended) A system according to claim [[3]] 1, wherein at least one modulation frequency used in said means for modulating is in a range between 500 to 50,000 KHz.

9. (currently amended) A system according to claim [[3]] 1, further comprising:

means for generating light of a third frequency;

means for modulating said light of said third frequency to produce a modulated third light signal which is different from said modulated first and second light signals;

said transmitting means being effective for transmitting said third light signal into said tooth;

said detecting means being effective for detecting shock waves induced in said tooth by said transmitted light of said first, second, and third light signals; and

said processing means being effective for processing said detected shock waves induced in said tooth by said transmitted light of said first, second, and third light signals to measure said erythema in said tooth.

10. (original) A system according to claim 9, wherein said third frequency has no specific absorption difference between oxygenated blood, deoxygenated blood, and at least one opaque area of said tooth.

11. (currently amended) A ~~system according to claim 1, further comprising:~~ A system for measuring erythema in a tooth, comprising:

means for generating light of a first frequency;

transmitting means for transmitting said light of said first frequency into said tooth;

detecting means for detecting shock waves induced in said tooth by said transmitted light of said first frequency;

processing means for processing said detected shock waves induced by said transmitted light of said first frequency to measure said erythema in said tooth;

means for generating light of a second frequency;

said transmitting means being effective for transmitting said light of said second frequency into said tooth;

said detecting means being effective for detecting shock waves induced in said tooth by said transmitted light of said second frequency; and

said processing means being effective for processing said detected shock waves induced in said tooth by said transmitted light of said second frequency to measure said erythema in said tooth;

wherein said first and second frequencies of light are transmitted into said tooth sequentially.

12. (original) A system according to claim 1, wherein said first frequency of light is in a near-infrared range.

13. (original) A system according to claim 1, further comprising means for displaying a measure of erythema in said tooth.

14. (original) A system according to claim 1, wherein said light is polarized.

15. (original) A system according to claim 1, wherein said processing means includes a database containing data corresponding to a healthy tooth.

16. (currently amended) A system for measuring erythema in a tooth, comprising:

a first generator for generating light of a first frequency;

a probe which transmits said light of said first frequency into said tooth;

a ~~detector~~ fiberoptic Fabry-Perot ultrasound sensor which detects shock waves induced in said tooth by said transmitted light of said first frequency; and

a processor which processes said detected shock waves induced by said transmitted light of said first frequency to measure said erythema in said tooth.

17. (original) A system according to claim 16, wherein said probe includes a fiberoptic delivery portion surrounded by said detector.

18. (original) A system according to claim 16, wherein said detector is a piezo-electric detector.

19. (cancelled).

20. (original) A system according to claim 16, further comprising a second ultrasound detector for sensing said shock waves.

21. (currently amended) ~~A system according to claim 16, further comprising:~~ A system for measuring erythema in a tooth, comprising:

a first generator for generating light of a first frequency;

a probe which transmits said light of said first frequency into said tooth;

a detector which detects shock waves induced in said tooth by said transmitted light of said first frequency;

a processor which processes said detected shock waves induced by said transmitted light of said first frequency to measure said erythema in said tooth;

a second generator for generating light of a second frequency;

a first modulator for modulating said light of said first frequency with a first pulse frequency;

a second modulator for modulating said light of said second frequency with a second pulse frequency;

wherein said probe transmits said modulated light of said first and second frequencies into said tooth;

said detector detects shock waves induced in said tooth by said transmitted modulated light of said first and second frequencies; and

said processor processes said detected shock waves induced by said transmitted modulated light of said first and second frequencies to measure said erythema in said tooth.

22. (original) A system according to claim 21, wherein said first frequency has a high absorption coefficient for oxygenated blood and said second frequency has a high absorption coefficient for deoxygenated blood.

23. (original) A system according to claim 22, wherein said first and second frequencies have a high contrast in absorption with enamel and dentin.

24. (original) A system according to claim 21, wherein said first frequency has a high absorption coefficient for blood and said second frequency has a low absorption coefficient for blood.

25. (original) A system according to claim 21, wherein said first and second frequencies of light are transmitted into said tooth simultaneously.

26. (original) A system according to claim 21, wherein said first and second pulse frequencies are in a range between 500 to 50,000 KHz.

27. (original) A system according to claim 21, further comprising:

a third generator for generating light of a third frequency;

a third modulator for modulating said light of said third frequency with a third pulse frequency;

wherein said probe transmits said modulated light of said first, second, and third frequencies into said tooth;

said detector detects shock waves induced in said tooth by said transmitted light of said first, second, and third frequencies; and

said processor processes said detected shock waves induced in said tooth by said transmitted light of said first, second, and third light frequencies to measure said erythema in said tooth.

28. (original) A system according to claim 27, wherein said third frequency has no specific absorption difference between oxygenated blood, deoxygenated blood, and at least one opaque area of said tooth.

29. (currently amended) ~~A system according to claim 16, further comprising:~~ A system for measuring erythema in a tooth, comprising:

a first generator for generating light of a first frequency;

a probe which transmits said light of said first frequency into said tooth;

a detector which detects shock waves induced in said tooth by said transmitted light of said first frequency;

a processor which processes said detected shock waves induced by said transmitted light of said first frequency to measure said erythema in said tooth;

a generator for generating light of a second frequency;

wherein said probe transmits said modulated light of said first and second frequencies into said tooth;

said detector detects shock waves induced in said tooth by said transmitted light of said first and second frequencies; and

said processor processes said detected shock waves induced by said transmitted light of said first and second frequencies to measure said erythema in said tooth;

wherein said first and second frequencies of light are transmitted into said tooth sequentially.

30. (currently amended) A system according to claim [[16]] 29, wherein said first frequency of light is in a near-infrared range.

31. (currently amended) A system according to claim [[16]] 29, further comprising a display for displaying a measure of erythema in said tooth.

32. (currently amended) A system according to claim [[16]] 29, wherein said light is polarized.

33. (currently amended) A system according to claim [[16]] 29, wherein said processor interacts with a database containing data corresponding to a healthy tooth.

34. (original) A method for measuring erythema in a tooth, comprising the steps of:

generating light of a first frequency;

transmitting said light of said first frequency into said tooth;

detecting shock waves induced in said tooth by said transmitted light of said first frequency; and

processing said detected shock waves induced by said transmitted light of said first frequency to measure said erythema in said tooth.

35. (original) A method according to claim 34, wherein said first frequency has a high absorption coefficient for blood.

36. (original) A method according to claim 34, further comprising the steps of:

generating light of a second frequency;

modulating said light of said first frequency to produce a modulated first light signal;

modulating said light of said second frequency to produce a modulated second light signal, wherein said modulated second light signal is different from said modulated first light signal;

transmitting said first and second light signals into said tooth;

detecting shock waves induced in said tooth by said transmitted first and second light signals; and

processing said detected shock waves induced by said transmitted light of said first and second light signals to measure said erythema in said tooth.

37. (original) A method according to claim 36, wherein said first frequency has a high absorption coefficient for oxygenated blood and said second frequency has a high absorption coefficient for deoxygenated blood.

38. (original) A method according to claim 37, wherein said first and second frequencies have a high contrast in absorption with enamel and dentin.

39. (original) A method according to claim 36, wherein said first frequency has a high absorption coefficient for blood and said second frequency has a low absorption coefficient for blood.

40. (original) A method according to claim 36, wherein said first and second light signals are transmitted into said tooth simultaneously.

41. (original) A method according to claim 36, wherein at least one modulation frequency used in said steps of modulating is in a range between 500 to 50,000 KHz.

42. (original) A method according to claim 36, further comprising the steps of:

generating light of a third frequency;

modulating said light of said third frequency to produce a modulated third light signal, wherein said modulated third light signal is different from said modulated first and second light signals;

transmitting said first, second, and third light signals into said tooth;

detecting shock waves induced in said tooth by said transmitted first, second, and third light signals; and

processing said detected shock waves induced by said transmitted light of said first, second, and third light signals to measure said erythema in said tooth.

43. (original) A method according to claim 42, wherein said third frequency has no specific absorption difference between oxygenated blood, deoxygenated blood, and at least one opaque area of said tooth.

44. (original) A method according to claim 34, further comprising the steps of:

generating light of a second frequency;

transmitting said light of said first and second frequencies sequentially into said tooth;

detecting shock waves induced in said tooth by said transmitted light of said first and second frequencies; and

processing said detected shock waves induced by said transmitted light of said first and second frequencies to measure said erythema in said tooth.

45. (original) A method according to claim 34, wherein said first frequency of light is in a near-infrared range.

46. (original) A method according to claim 34, further comprising the step of displaying a measure of erythema in said tooth.

47. (original) A method according to claim 34, wherein said light is polarized.

48. (original) A method according to claim 34, wherein said step of processing includes interacting with a database containing data corresponding to a healthy tooth.